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EXAMINER

PHAM, TUAN

ART UNIT PAPER NUMBER

2643

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/855,255

Applicant(s)

EDWARDS ET AL.

Examiner

TUAN A PHAM

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16, 18-25, 27-28 and 31-34 is/are allowed.
- 6) ☒ Claim(s) 1-12, 17, 26, 29-30, and 35-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2-4</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 5 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The use of "figure 6 Protocol" does not compliance with the format of the U.S. practice and the method steps of claims.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 1-4, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensson et al. (U.S. Patent No. 6,560,332, hereinafter, "Christensson") in view of Rao (U.S. Patent No. 6,141,415).

**Regarding claim 1**, Christensson teaches a method of processing a far-end signal and a near-end signal to produce a final signal, the far-end signal containing speech, the near-end signal containing speech and background noise, the method comprising (see figure 2, near-end signal +echo and noise, far-end signal):

removing a portion of the background noise from the near-end signal to create a noise-reduced near-end signal (see col.6, ln.40-67), and

combining the far-end signal with the noise-reduced near-end signal to create a combined signal (see col.4, ln.58-65).

It should be noticed that Christensson fails to clearly teach the determining an amplification gain based upon the near-end signal, and amplifying the combined signal by the amplification gain to create the final signal. However, Rao teaches such features (see col.5, ln.45-56, col.6, ln.45-55) for a purpose of amplifying the signals in transmitting or receiving path.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of determining an amplification gain based upon the near-end signal, and amplifying the combined signal by the

amplification gain to create the final signal, as taught by Rao, into view of Christensson in order to improve the background noise and echo in communication systems.

**Regarding claim 2**, Christensson further teaches the method wherein the act of determining the amplification gain includes determining the masking level of the near-end signal (see col.5, ln.59-65).

**Regarding claim 3**, Rao further teaches the method wherein the act of determining the amplification gain includes determining the sound pressure level (energy signal) of the near-end signal (see col.6, ln.38-45).

**Regarding claim 4**, Rao further teaches the method wherein the act of determining the amplification gain includes determining the sound pressure level above the threshold of hearing audibility (20Hz-20KHz)(see col.5, ln.9-14).

**Regarding claim 12**, Christensson further teaches the method wherein the act of removing a portion of the background noise from the near-end signal includes removing a portion of the background noise via the spectral subtraction technique (using single MIC, see figure 1, MIC 110).

5. Claims 35-38, 42, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kennedy et al. (U.S. Patent No. 6,377,825, hereinafter, "Kennedy") in view of Rao (U.S. Patent No. 6,141,415).

**Regarding claim 35**, Kennedy teaches a communication device comprising (see figure 3):

a transmitter/receiver adapted for a communication medium (see figure 3, receivers/transmitters 338, col.7, ln.50-52),

control circuitry coupled to the transmitter/receiver that controls transmission, reception and control of audio signals (see figure 3, DSP 328, col.7, ln.45-50),

a speaker coupled to the control circuitry that renders audio signals audible (see figure 1, speaker 366), and

a microphone coupled to the control circuitry that transforms sounds into a side tone signal (see figure 1, MIC 368).

It should be noticed that Kennedy fails to clearly teach a noise filter that receives the sidetone signal and produces a noise-reduced sidetone signal, and an amplifier that combines an audio signal received from the transmitter/receiver with the noise-reduced sidetone signal to produce a combined signal, amplifies the combined signal according to a function responsive to the background noise in the sidetone, and provides an enhanced audio signal to the speaker. However, Rao teaches such features (see figure 2, col. 3, ln.40-45, col5, ln.29-60, col.6, ln.48-55) for a purpose of amplifying the signals in transmitting or receiving path.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of a noise filter that receives the sidetone signal and produces a noise-reduced sidetone signal, and an amplifier that combines an audio signal received from the transmitter/receiver with the noise-reduced sidetone signal to produce a combined signal, amplifies the combined signal according to a function responsive to the background noise in the sidetone, and provides an

enhanced audio signal to the speaker, as taught by Rao, into view of Kennedy in order to improve the background noise and echo in communication systems.

**Regarding claim 36**, Kennedy further teaches the communication device wherein the control circuitry includes a digital signal processor (see figure 3, DSP 328).

**Regarding claim 37**, Rao further teaches the communication device wherein the noise filter includes instructions executed by the control circuitry (see col.4, ln.12-20).

**Regarding claim 38**, Rao further teaches the communication device wherein the noise filter executes a process to reduce background noise in the sidetone signal (see col.4, ln.12-20).

**Regarding claim 42**, Rao further teaches the communication device wherein the amplifier includes instructions executed by the control circuitry (see col.5, ln.45-56).

**Regarding claim 46**, Rao further teaches the communication device including a second microphone coupled to the amplifier that is used for estimating background noise (see figure 2, AMP 78, MIC 80).

6. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensson et al. (U.S. Patent No. 6,560,332, hereinafter, "Christensson") in view of Rao (U.S. Patent No. 6,141,415) as applied to claim 1 above, and further in view of Walker et al. (U.S. Patent No. 5,884,270, hereinafter, "Walker").

**Regarding claim 6-9**, Christensson and Rao, in combination, fails to clearly teach the Cambridge protocol, the NAL-NL1 protocol, the Independent Hearing Aid Fitting Forum protocol, and the Desired Sensation Level input/output protocol. However,

Walker teaches the Cambridge protocol. Thus by choosing different type protocol as claimed would not involve any inventive feature since it is just a matter of selecting the type of protocol for a purpose of changing the operation of the amplification gain.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the use of the Cambridge protocol, the NAL-NL1 protocol, the Independent Hearing Aid Fitting Forum protocol, and the Desired Sensation Level input/output protocol, as taught by Walker, into view of Christensson and Rao in order to meet the characteristic of particular frequency band.

7. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensson et al. (U.S. Patent No. 6,560,332, hereinafter, "Christensson") in view of Rao (U.S. Patent No. 6,141,415) as applied to claim 1 above, and further in view of Voroba et al. (U.S. Patent No. 6,091,965, hereinafter, "Voroba").

**Regarding claim 10**, Christensson and Rao, in combination, fails to clearly teach the method wherein the act of removing a portion of the background noise from the near-end signal includes filtering the near-end signal with a high-pass filter. However, Voroba teaches such features (see figure 6B, high pass filter 54. col.8, ln.63) for a purpose of blocking the low frequency.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of the method wherein the act of removing a portion of the background noise from the near-end signal includes filtering the near-end signal with a high-pass filter, as taught by Voroba, into view of



Christensson and Rao in order to filter out the background noise and echo in communication system.

**Regarding claim 11**, Voroba further teaches the method wherein the act of removing a portion of the background noise from the near-end signal includes filtering the near-end signal with a high-pass filter and suppression of the DC component of the near-end signal (see figure 6B, AMP 52, high pass filter 54).

8. Claims 26, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensson et al. (U.S. Patent No. 6,560,332, hereinafter, "Christensson") in view of Rao (U.S. Patent No. 6,141,415) as applied to claim 1 above, and further in view of Kennedy et al. (U.S. Patent No. 6,377,825, hereinafter, "Kennedy").

**Regarding claim 26**, Christensson and Rao, in combination, fails to clearly teach a program storage device containing computer readable instructions that when executed by a digital signal processor performs the method. However, Kennedy teaches such features (see col.13, ln.12-17) for a purpose of controlling the operation of the system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of a program storage device containing computer readable instructions that when executed by a digital signal processor perform the method, as taught by Kennedy, into view of Christensson and Rao in order to control the transmits and receives signals in communication devices.

**Regarding claims 29 and 30**, Kennedy further teaches a telephone containing a digital signal processor and the program storage device (see figure 3, DSP 328, col.13, ln.12-17).

9. Claims 39-41, and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kennedy et al. (U.S. Patent No. 6,377,825, hereinafter, "Kennedy") in view of Rao (U.S. Patent No. 6,141,415) as applied to claim 35 above, and further in view of Allen et al. (U.S. Patent No. 5,553,134, hereinafter, "Allen").

**Regarding claim 39**, Kennedy and Rao, in combination, fails to clearly teach the communication device wherein the noise filter executes a process including determining a masking level of noise of the sidetone signal. However, Allen teaches such features (see col.7, ln.48-59) for a purpose of reducing noise level in communication devices.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of communication device wherein the noise filter executes a process including determining a masking level of noise of the sidetone signal, as taught by Allen, into view of Kennedy and Rao in order to improve the background noise in communication system.

**Regarding claims 40 and 41**, Allen further teaches the communication device wherein the noise filter executes a process including determining a masking level of noise of a sidetone subband signal (see col.10, ln.40-67, col.11, ln.1-24).

**Regarding claims 43-45**, Allen further teaches the communication device wherein the amplifier executes a process including determining the spectral density of

the background noise in the sidetone to produce parameters for multiband compression of the combined signal (see col.10, ln.40-67, col.11, ln.1-24).

***Allowable Subject Matter***

10. Claims 13-16, 18-25, 27-28, and 31-34 are allowed.

**Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In order to expedite the prosecution of this application, the applicants are also requested to consider the following references. Although Piket et al. (U.S. Patent No. 6,618,701), Haimi-Cohen et al. (U.S. Patent No. 6,711,259), Ashley (U.S. Patent No. 6,366,880), and Oh (U.S. Patent No. 5,933,495) are not applied into this Office Action, they are also called to Applicants attention. They may be used in future Office Action(s). These references are also concerned for supporting the system and method for suppressing acoustic background noise and subband spectral energies in communication system.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tuan A. Pham** whose telephone number is (703) 305-4987. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Curtis Kuntz can be reached on (703) 305-4708 and

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